What is claimed is:

1. A method of screening for the presence of a cancer cell, comprising:
   a. obtaining a cell from a subject;
   b. contacting the cell with a probe capable of hybridizing to a nucleic acid of the cell; and
   c. detecting the hybridization pattern of the probe, whereby the hybridization pattern can distinguish a non-cancer cell from a cancer cell, thereby screening for the presence of a cancer cell.

2. The method of claim 1, wherein the cell is a tumor cell.

3. The method of claim 1, wherein the cell is an epithelial cell.

4. The method of claim 1, wherein the cell is a circulating cell.

5. The method of claim 4, wherein the circulating cell is a circulating epithelial cell.

6. The method of claim 5, wherein the cell is from a sample enriched for ciculating epithelial cells.

7. The method of claim 6, wherein the enrichment of the sample for circulating epithelial cells is achieved by cytokeratin screening.

8. The method of claim 1, wherein the probe is associated with a specific cancer, thereby identifying the organ-origin of the cancer cell.

9. The method of claim 1, wherein the probe is specific for a genetic marker.

10. The method of claim 1, wherein the probe is associated with a chromogenic dye.

11. The method of claim 1, wherein the probe is associated with a fluorescent dye.

12. The method of claim 1, wherein detection comprises spectral imaging.

13. The method of claim 1, wherein detection comprises utilizing multiple probes.

14. A method of screening for the presence of a cancer cell, comprising:

a. obtaining a biological sample from a subject, wherein the biological sample comprises a mixed cell population suspected of containing a population of epithelial cells which include a cancer cell;

b. mixing the biological sample with magnetic particles coupled to a ligand which is capable of reacting specifically with epithelial cells to the substantial exclusion of non-epithelial cells;

c. enriching the biological sample for epithelial cells by subjecting the cells of step b to a magnetic field to produce a cell suspension that is enriched epithelial cells;

d. contacting the cells of step c with a probe capable of hybridizing to nucleic acid of the cell; and

e. detecting the hybridization pattern of the probe, whereby the hybridization pattern can distinguish a non-cancer cell from a cancer cell, thereby screening for the presence of a cancer cell.

15. A method of determining the status of a cancer comprising:

a. obtaining a biological sample containing a cell from a patient diagnosed with cancer;

b. contacting the cell in the sample with a probe capable of hybridizing to nucleic acid of the cell;

c. detecting the hybridization pattern of the probe, whereby the hybridization pattern can distinguish a non-cancer cell from a cancer cell;

d. determining the amount of cancer cells in the sample and correlating the amount of cancer cells in the sample with a stage of cancer, thereby determining the status of the cancer.

16. A method of determining the status of a cancer comprising:

a. obtaining a biological sample containing a cell from a patient diagnosed with cancer;

b. contacting the cell in the sample with a probe under conditions capable of forming a complex with an antigen of the cell;

c. detecting the complex, whereby detection of the complex can distinguish a non-cancer cell from a cancer cell;

d. determining the amount of cancer cells in the sample; and

e. correlating the amount of cancer cells in the sample with a stage of cancer, thereby determining the status of the cancer.

17. A method of determining the progression of a cancer comprising:

a. obtaining a biological sample containing a cell at a first time point from a patient diagnosed with cancer and obtaining a biological sample containing a cell from the patient at a second time point;

b. contacting the cell in the first sample and the cell in the second sample with a probe capable of hybridizing to nucleic acid of the cell;

c. detecting the hybridization pattern of the probe, whereby the hybridization pattern can distinguish a non-cancer cell from a cancer cell;

d. determining the amount of cancer cells in both the first sample and the second sample; and

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e. comparing the amount of cancer cells in both the first sample and the second sample, whereby the relative amount of cancer cells in the first sample as compared with the second sample may be correlated with the progression of cancer, thereby determining the progression of the cancer.

18. A method of determining the progression of a cancer comprising:

a. obtaining a biological sample containing a cell at a first time point from a patient diagnosed with cancer and obtaining a biological sample containing a cell from the patient at a second time point;

b. contacting the cell in the first sample and the cell in the second sample with a probe under conditions which allow the probe to form a complex with an antigen of the cell;

c. detecting the complex in both the first sample and the second sample, whereby detection of the complex can distinguish a non-cancer cell from a cancer cell;

d. determining the amount of cancer cells in the first sample and the second sample; and

e. comparing the amount of cancer cells in both the first sample and the second sample, whereby the relative amount of cancer cells in the first sample as compared with the second sample may be correlated with the progression of cancer, thereby determining the progression of the cancer.

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20. A method of determining the effectiveness of an anti-cancer treatment comprising:

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a. obtaining a biological sample containing a cell from a patient that has been administered an anti-cancer treatment;

b. contacting the cell in the sample with a probe capable of hybridizing to nucleic acid of the cell;

c. detecting the hybridization pattern of the probe, whereby the hybridization pattern can distinguish a non-cancer cell from a cancer cell;

d. determining the amount of cancer cells in the sample and correlating the amount of cancer cells in the sample with the effectiveness of the anti-cancer treatment, thereby determining the determining the effectiveness of an anti-cancer treatment.

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~~21~~. A method of determining the effectiveness of an anti-cancer treatment comprising:

a. obtaining a biological sample containing a cell from a patient that has been administered an anti-cancer treatment;

b. contacting the cell in the sample with a probe under conditions capable of forming a complex with an antigen of the cell;

c. detecting the complex, whereby detecting the complex can distinguish a non-cancer cell from a cancer cell;

d. determining the amount of cancer cells in the sample and correlating the amount of cancer cells in the sample with the effectiveness of the anti-cancer treatment, thereby determining the determining the effectiveness of an anti-cancer treatment.

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